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Paradoxical underuse of revascularization in patients with non-ST-segment elevation acute coronary syndromes and heart failure

There have been major advances in the treatment of acute coronary syndromes (ACS) over the past 20 years, and clinical outcomes have improved continuously and markedly.[1] Progress has stemmed from earlier diagnosis and management, improved pharmacological treatment (notably effective antithrombotic therapies), and increasing use of myocardial revascularization techniques.

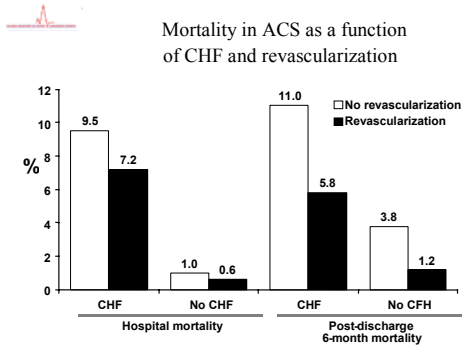
Treatment is now codified according to guidelines, which, despite minor differences, are remarkably consistent in Europe and North America. One of the common features of these guidelines is the uniform recommendation for risk stratification and the recommendation that high-risk patients be rapidly triaged to coronary angiography with a view to revascularization.

Patients with heart failure represent a sizeable proportion of patients with NSTE-ACS. In the OASIS V randomized trial, 8.6% of the patients entered into the trial were in Killip class II or III[2] (patients with cardiogenic shock being excluded). However, randomized trials tend to enrol highly selected patients, and exclude patients with higher-risk features. Indeed, in the GRACE registry, approximately 16% of patients presenting with NSTE ACS were Killip class II or III at the time of admission, with an additional 2% being in cardiogenic shock.[3] Both in the trial and in the registry, patients with heart failure clearly had clinical characteristics associated with a higher risk of death than patients with heart failure, and indeed, the short- and long-term death rates of patients with heart failure were far higher than those of patients without. In OASIS 5, the 9-day mortality was 5.9% vs 1.4% for patients with vs without heart failure, and the 180-day mortality was 17.2 vs 5.1%. Therefore, class II or III heart failure at enrolment was associated with a 3- to 4-fold increase in mortality. Similarly, in the GRACE registry, class II or III heart failure at admission was associated with a marked increase in hospital (8.9% vs 0.9%) and postdischarge 6-month mortality (9.6 vs 2.9%). These results are expected and consistent with the important detrimental impact on prognosis of heart failure.

What was unexpected, however, is the fact that patients with heart failure, despite being at much higher risk of death than patients without heart failure, undergo far fewer revascularization procedures: in the GRACE registry the rate of revascularization during the index hospital stay was 20% for patients with CHF compared with 35% without CHF. Likewise, in the OASIS-V trial, the rate of revascularization (using either PCI or CABG) was 46.6 vs 28.8% for patients without vs with CHF. These lower rates of revascularization in patients with ACS and CHF are in contradiction to guidelines and to results of clinical trials of revascularization in ACS, which suggest that the greatest benefits of revascularization are achieved in patients at highest risk. They are, however, consistent with prior observations that revascularization is underused in high-risk patients with ACS.[4]

Would higher revascularization rates reduce mortality in this subset? This is what clinical trials suggest. Observations from GRACE also show that mortality rates are much lower, particularly after discharge, in patients who have undergone revascularization *(Figure)*, although these differences may, at least in part, stem from lower baseline risk in patients selected for revascularization. Multivariate analyses, adjusting for propensity to undergo revascularization, differences in baseline risk between patients with vs without revascularization and considering revascularization as a time-dependent covariate, do suggest that post-discharge mortality is lower in patients undergoing revascularization (hazard ratio 0.64; 95% CI 0.45–0.93, *P*=0.02).

Figure.



In summary: CHF is a frequent and ominous complication of non-ST-segment elevation ACS. Despite clinical trial results and international guidelines, there is evidence of underuse of revascularization in this high-risk subset. Broader use of revascularization in this high-risk group has the potential to substantially reduce mortality.

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References: 1. Fox KAA et al. *JAMA*. 2007;29:1892-1900. **2.** Steg PG et al. *Circulation*. (Suppl) 2008; (abstract). **3.** Steg PG et al. *Circulation.* 2008;118:1163-1171. **4.** Bhatt DL et al. *JAMA*. 2004;292:2096-1104.

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